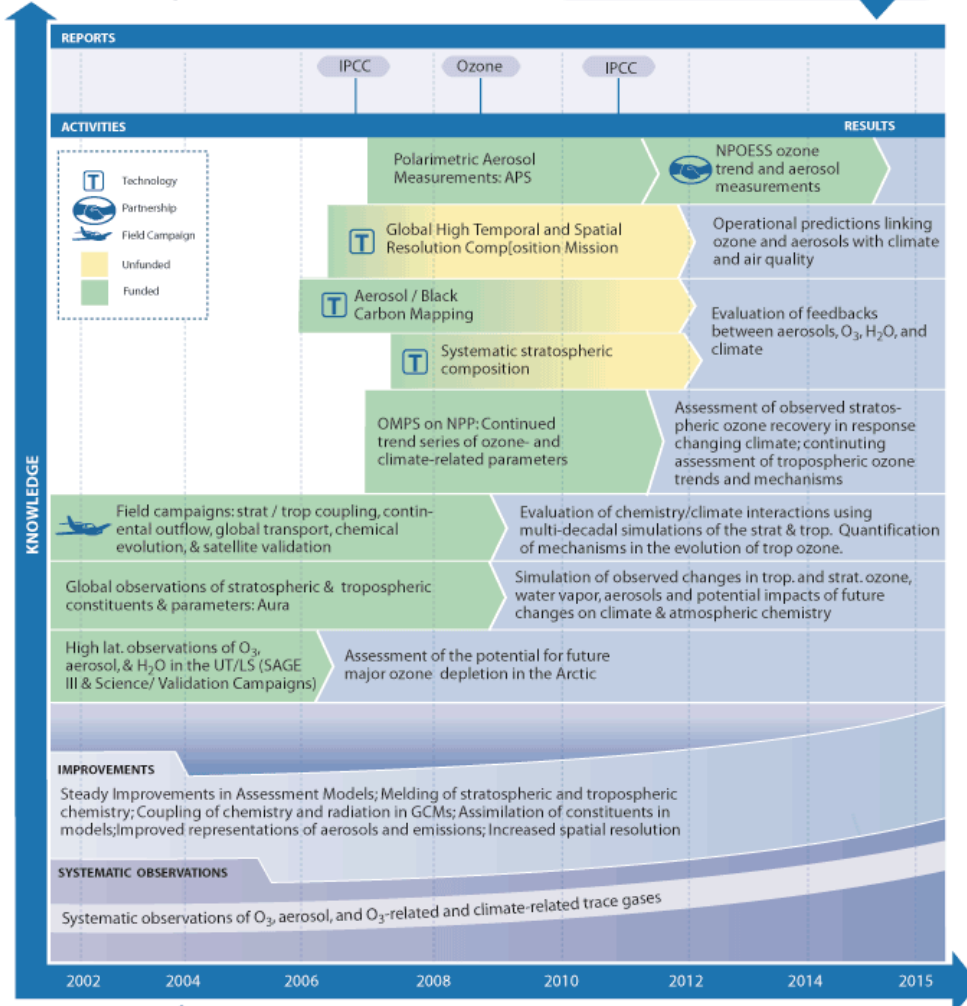


# Atmospheric Composition Roadmap

## WHERE WE PLAN TO BE:

Improved prognostic ability for the recovery of stratospheric ozone and the impacts surface UV, evolution of greenhouse gases, climate impacts, tropospheric ozone and aerosols, and the impacts on climate and air quality



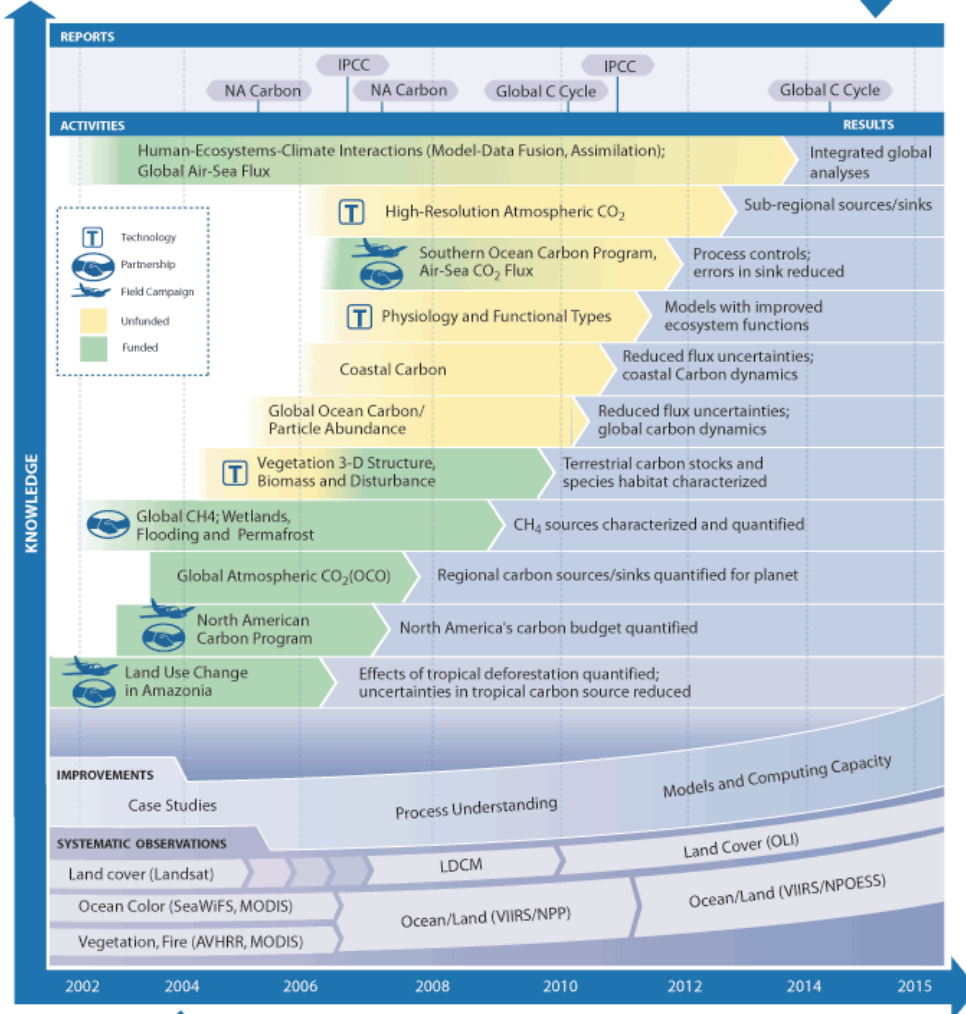
## WHERE WE ARE NOW:

Halogen chemistry shown responsible for stratospheric O<sub>3</sub> losses; Tropospheric O<sub>3</sub> not well understood, but long-range transport and global change seem; Uncertainties in feedbacks between strat. O<sub>3</sub> recovery, trop. O<sub>3</sub> trends, & climate; Poor knowledge and modeling of the chemical evolution of aerosols

# Carbon Cycle and Ecosystems Roadmap

## WHERE WE PLAN TO BE:

Global productivity and land cover change at fine resolution; biomass and carbon fluxes quantified; useful ecological forecasts and improved climate change projections



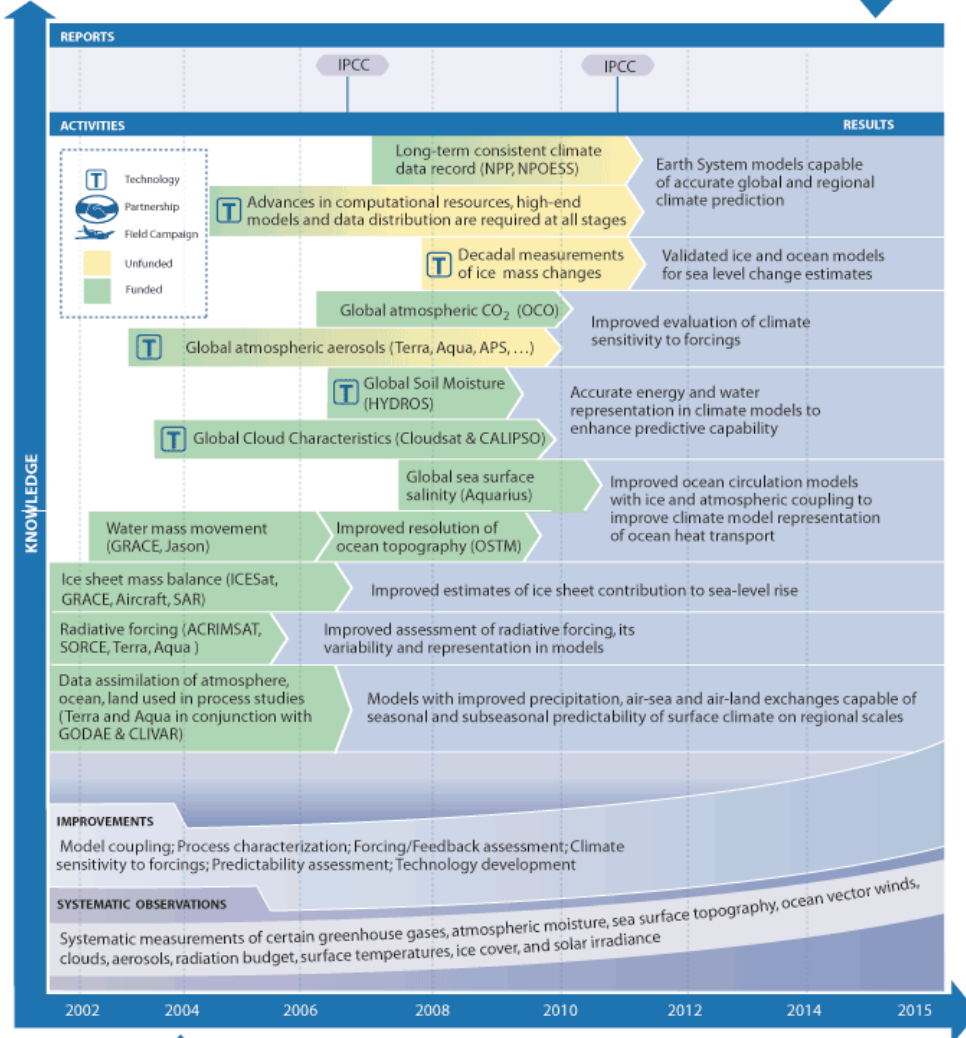
## WHERE WE ARE NOW:

2002: Global productivity and land cover resolution coarse; Large uncertainties in biomass, fluxes, disturbance, and coastal events

# Climate Variability and Change Roadmap

## WHERE WE PLAN TO BE:

Characterization and reduction of uncertainty in long-term climate prediction; Enable routine probabilistic forecasts of precipitation, surface temperature, and soil moisture; Sea-level rise prediction



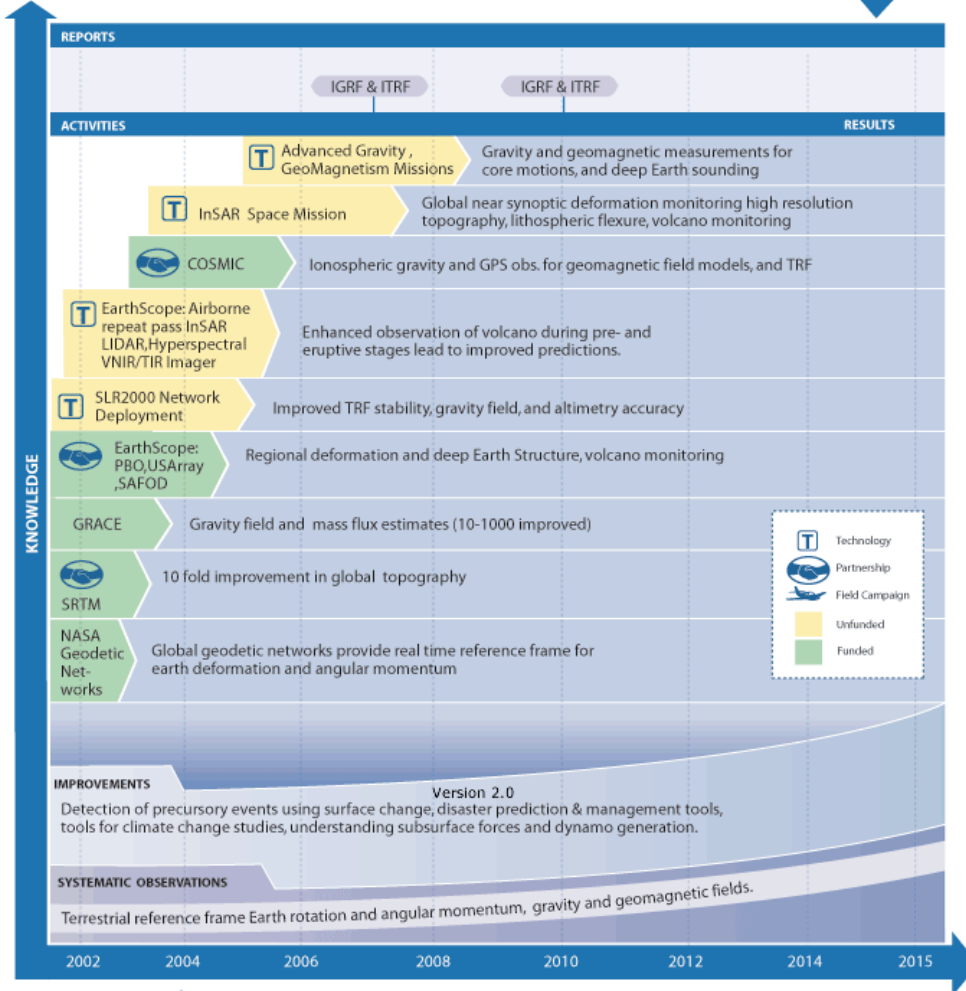
## WHERE WE ARE NOW:

Experimental 12-month forecasts of surface temperature, precipitation; Fair knowledge of global climate variables and their trends; Climate models that simulate long-term global temperature change with large uncertainty in forcings and sensitivity.

# Earth Surface and Interior RoadMap

## WHERE WE PLAN TO BE:

Understand plate boundary deformation & earth-quake hazards; How tectonics & climate interactions shape the Earth's surface; Sea level changes from the interactions of ice masses, oceans, & the solid Earth



## WHERE WE ARE NOW:

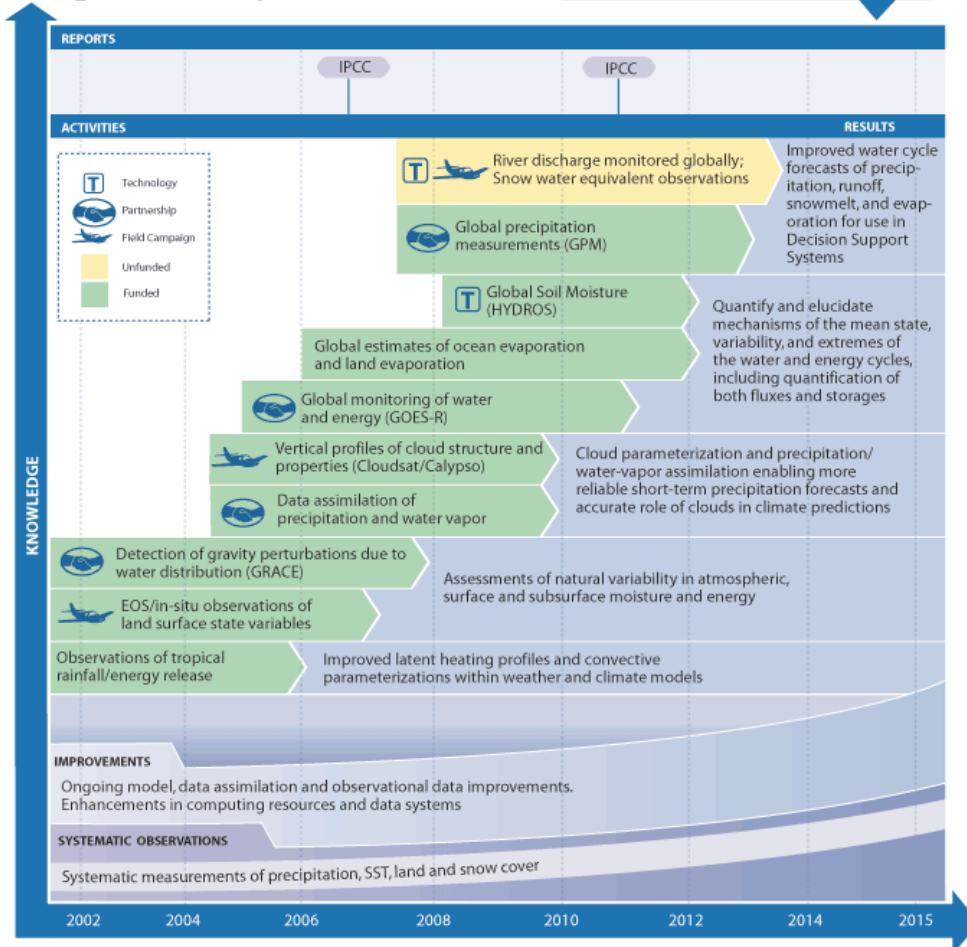
Space geodesy determines mm scale topography changes; Detection of Periodic and aseismic cm-scale strain events, and some seismic precursors. Postseismic stress changes linked to certain earthquakes; Volcanic inflation detected by InSAR reflect movement of magma at depth without seismic or eruptive signals.

Version 2.0

# Water and Energy Cycle Roadmap

## WHERE WE PLAN TO BE:

Capability to observe, model, and predict the Water and Energy cycles, including regional scales and extreme events



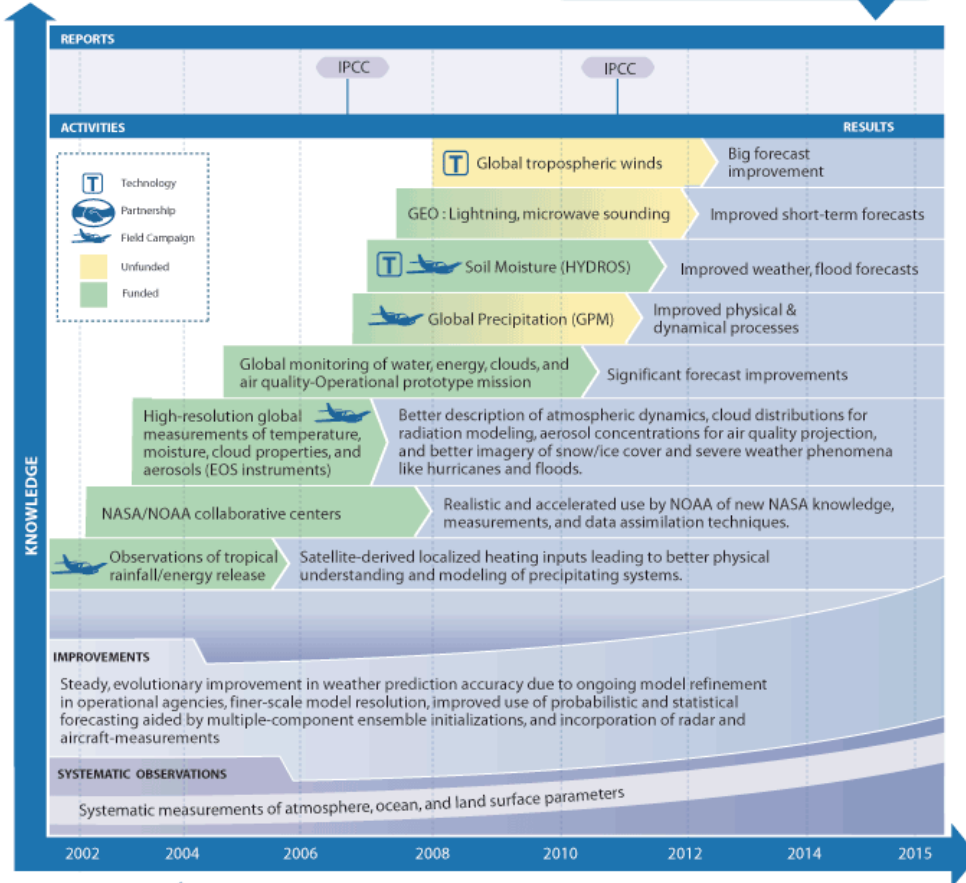
## WHERE WE ARE NOW:

Reservoirs and tropical rainfall well quantified  
Difficulty balancing the water budget on any scale  
Inability to observe and predict precipitation globally

# Weather Roadmap

## WHERE WE PLAN TO BE:

Weather and severe storm forecasting (especially hurricane landfall tracking accuracy) will be greatly improved.



## WHERE WE ARE NOW:

Weather satellite sensor and technique development; used by NOAA

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